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Original Article

Differences between physicians in the likelihood of referral and acceptance of elderly patients for dialysis-influence of age and comorbidity

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Abstract

Background. Incidence of dialysis in elderly patients in the Netherlands is low compared to other countries. This study aims to assess the impact of patients' age and comorbidity on the likelihood of referral and acceptance of patients for dialysis and whether this is affected by physician characteristics.

Methods. A vignette study was performed among 209 primary care physicians, 162 non-nephrology specialists and 20 nephrologists working in the north of the Netherlands. Physicians were offered six vignettes concerning case-reports of patients with end-stage renal disease (ESRD) and varying comorbidities or circumstances and asked about the likelihood of referral/acceptance of the patient in the given circumstances.

Results. The likelihood of referral within groups of physicians varied widely, especially within the group of primary care physicians and non-nephrology specialists, but was not affected by characteristics of physicians. The likelihood of referral or acceptance of patients for dialysis depended on the patient's age, and type and severity of comorbidity. In general, primary care physicians and non-nephrology specialists were less likely to refer than nephrologists were to accept. Differences within and between groups of physicians were larger for 80- than for 65-year-old patients, and for patients with less severe shortness of breath and cognitive impairments and more severe diabetes and social impairments. Hardly any differences were found for patients with cancer.

Conclusion. Patients' age and comorbidities affect the likelihood of referral. Differences between groups of physicians suggest that there is insufficient agreement on the extent to which these factors should affect the

referral/acceptance of patients for dialysis. These findings underline the need for more research into circumstances under which patients might benefit from dialysis. Guidelines should be developed to improve the referral of elderly and less healthy patients.

Keywords: dialysis; elderly; end-stage renal disease; non-nephrology specialists; primary care physicians; referral

Introduction

In the early days of dialysis, this treatment was only offered to patients who were young and healthy. As a consequence of the improvement of quality and quantity of dialysis since then, positive effects are achieved in older and less healthy patients. Elderly patient survival [1] and quality of life seem to be good [2,3].

Previous studies proved that the likelihood of referral decreased for patients who were older and had more comorbidities [4–6]. Besides, the likelihood of referral appeared to depend on characteristics of physicians, such as age [6,7], years of experience [8] and type of hospital [9]. In general, nephrologists were more likely to accept elderly patients for dialysis than primary care physicians and non-nephrology specialists [4,5,9]. It is argued that primary care physicians and non-nephrology specialists have insufficient knowledge about indication and prognosis of dialysis in patients this age [4,10]. This may indicate that patients who might benefit from dialysis are not always referred for this treatment.

A considerable variability exists between European countries in the number of elderly patients who started dialysis [11]. In the Netherlands, the incidence of elderly patients who started dialysis is relatively low. This was particularly the case in comparison to that of

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Table 1. Appendix

Primary care physicians and specialists were asked if they would indicate for each of the following statements the likelihood that they would refer this patient to an internist or a nephrologist. Nephrologists were asked if they would indicate the likelihood they would accept the patient for dialysis.

All the vignettes presented a case of a patient with a creatinine level of 400 $\mu\text{mol/l}$ and a comorbidity; the same cases were presented for a 65- and 80-year old patient. Answers can be given on a five-point scale:

(1) *definitely not*, (2) *probably not*, (3) *uncertain*, (4) *probably*, (5) *definitely*

Shortness of breath

Patient has had prior myocardial infarction. The cardiologist argues that the patient would not benefit from bypass surgery. Patient is on optimal medical therapy and she lives with a husband.

a. Patient has shortness of breath during heavy exertion, such as intensive sporting.

b. Patient has shortness of breath at rest.

Cancer

Patient has been diagnosed with cancer a year ago.

a. Patient has prostate cancer, but no metastases.

b. Patient has a melanoma and metastases, treatment is palliative.

Diabetes

a. Patient has diabetes, is regulated well and has no specific problems.

b. Patient experiences serious complications, such as cardiac problems and diabetic foot.

Psychiatric disorder

a. Patient is depressed.

b. Patient has schizophrenia and a tendency to violent behaviour.

Cognitive impairments

a. Patient has some problems with memory and is sometimes disorientated in time.

b. Patient is disoriented in person, impaired in emotional expression and hardly responds to pain and danger.

Social situation

Partner died of cancer a year ago. Since that time the pleasure of life decreased.

a. Patient is healthy, has a lot of social contacts and activities.

b. Patient lives a retired life, has little social contacts and never goes out.

Belgium, the neighbouring country that has similar geographic and social-cultural characteristics. The reasons for this low incidence are not clear, but may be attributable to restricted referral by (subgroups of) primary care physicians and non-nephrology specialists. This study is designed to provide more insight into factors that might influence the referral or acceptance behaviour of physicians in the Netherlands. Aims of the present study were (i) to identify the impact of physician characteristics and patient age and comorbidity on the likelihood of physicians to refer or accept patients above age 65 with end-stage renal disease (ESRD) for dialysis, and (ii) to examine the extent to which physicians differ in the likelihood of referral or acceptance of these patients for dialysis.

Subjects and methods

Procedure

Three groups of physicians in the north of the Netherlands were approached for study participation: a random sample of 500 primary care physicians (out of the 1067), all physicians whose speciality was internal medicine (endocrinology-diabetology, haemato-oncology, vascular medicine, immunology), gastroenterology, cardiology, pulmonology or rheumatology and all nephrologists. Questionnaires and prepaid return envelopes were sent. Physicians were offered a €20 incentive for completion of the questionnaire. Confidentiality was assured because the questionnaire had no identifying information. A second mailing was sent to all physicians 4 weeks after the first mailing. The study was approved by the medical ethical committee of the University Medical Centre Groningen.

Data collection

The questionnaire contained items on physician characteristics such as gender and age, type of hospital (small peripheral hospitals <200 beds, peripheral hospitals >200 beds, university hospitals) and on whether patient's age affects their decision to refer or accept patients for dialysis. Next, physicians were offered six vignettes. These concerned case-reports of patients with ESRD and varying comorbidities or circumstances. The comorbidities involved cardiac problems, cancer, diabetes, psychiatric disorders, cognitive and social impairments varying in severity (Table 1). The same cases were presented for 65- and 80-year-old patients. The creatinine level was stated in all vignettes at 400 $\mu\text{mol/l}$. Heights and weights of patients were also given. Answers were rated on a 5-point Likert-type scale (1 = 'definitely not refer' to 5 = 'definitely refer'). Physicians were asked the likelihood that they would refer the patients in the given circumstances. The vignettes were pre-tested among a number of primary care physicians, specialists and nephrologists.

Statistical analyses

Descriptive statistics were used to characterize the studied population in terms of socio-demographic and practice-related variables.

The effects of physicians' age, gender, religiosity, number of hours working, years in practice, type of practice or hospital, population density (primary care physicians) and specialization (specialists) on the likelihood that physicians would probably or definitely refer/accept patients for dialysis were examined using Chi-squares and *t*-test (because of the small sample of nephrologists the Mann-Whitney test was used for this group). Owing to the large number of comparisons within these analyses, the statistical significance

Table 2. Characteristics of primary care physicians, specialists and nephrologists

	Primary care physicians <i>N</i> = 209	Specialists <i>N</i> = 162	Nephrologists <i>N</i> = 20
Socio-demographics			
Gender			
Female	58 (27.8)	34 (21.0)	3 (15.0)
Male	151 (72.2)	128 (79.0)	17 (85.0)
Age			
Mean (SD)	48.0 ± 8.5	48.5 ± 8.5	44.9 ± 6.0
Religion			
Yes	84 (40.2)	69 (42.6)	13 (65.0)
No	125 (59.8)	93 (57.4)	7 (35.0)
Practice descriptions			
Number of hours working			
Fulltime	141 (67.5)	141 (87.0)	16 (80.0)
Years in practice			
Mean (SD)	16.2 ± 9.1	14.0 ± 8.2	10.6 ± 7.6
Type of practice			
Single practice	76 (36.4)	n/a	n/a
Practice of 2 doctors	74 (35.4)	n/a	n/a
Practice of ≥3 doctors	59 (28.2)	n/a	n/a
Population density			
Population per municipality per km ²			
Rural, less than 500	61 (29.3)	n/a	n/a
Little urban, 500–1000	49 (23.6)	n/a	n/a
Moderate urban, 1000–1500	28 (13.5)	n/a	n/a
High urban, 1500–2500	25 (12.0)	n/a	n/a
Very high urban, >2500	14 (6.7)	n/an/a	n/a
Missing	32 (14.9)	n/a	n/a
Type of hospital			
Small peripheral hospitals			
<200 beds	n/a	15 (9.3)	–
Peripheral hospital			
≥200 beds	n/a	104 (64.2)	13 (65.0)
University hospital	n/a	43 (26.5)	7 (35.0)

Values expressed as number (percentages) or mean±SD. n/a, not applicable

was set at $P \leq 0.01$. In the case of statistically significant differences within groups of physicians, odds ratios (OR) and 95% confidence interval (CI) were performed.

McNemar Chi-square tests were used to examine the effects of the patient's age and severity of comorbidity on the likelihood that physicians would probably or definitely refer/accept patients for dialysis. OR and 95% CI were calculated additionally. Because comparisons of these data are made on the same physicians the formula for matched-pair data was used.

Comparisons of the percentages of on the one hand primary care physicians and non-nephrology specialists, and on the other hand nephrologists who would probably or definitely refer/accept patients were made using Chi-square analyses. In the case of statistically significant differences between groups of physicians, OR and 95% CI were calculated as well.

Results

Participant characteristics

Two hundred and nine primary care physicians (response 43%), 162 non-nephrology specialists (response 43%) and 20 nephrologists (response 63%)

participated in the study. Information on socio-demographic variables is displayed in Table 2.

Primary care physicians who participated did not differ significantly in age and population density of their practice location from all primary care physicians in the northern region of the Netherlands, but were more often female ($\chi^2 = 6.8$, $P = 0.009$) and were more often working in a practice with two physicians than in a single practice ($\chi^2 = 9.9$, $P = 0.007$). Non-nephrology specialists and nephrologists who participated did not significantly differ in gender and type of hospital from the specialists and nephrologists working in the northern region.

Referral decisions and physician characteristics. Figure 1 shows the percentage of the three groups of physicians who would probably or definitely refer patients with ESRD and varying comorbidities or circumstances. The likelihood of referral within groups of physicians differed, especially within the group of primary care physicians and non-nephrology specialists, regarding 80-year-old patients and patients with more severe comorbidities. Considerable agreement exists among nephrologists regarding the acceptance of patients.

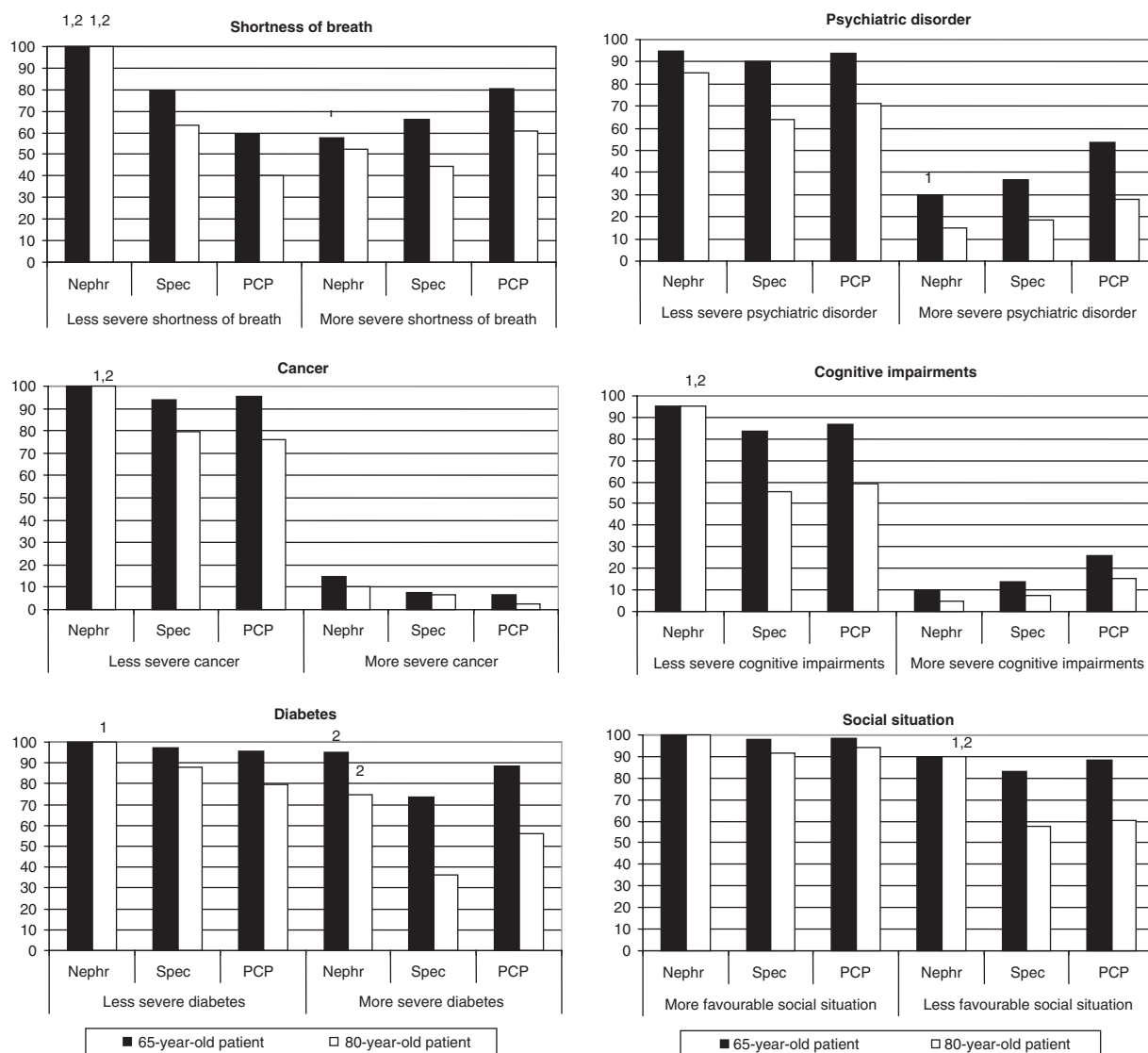


Fig. 1. Percentage of nephrologists (Neph), specialists (Spec) and primary care physicians (PCP), who would probably or definitely refer patients with less or more severe comorbidities. Percentages differed significantly ($P < 0.05$) between 1 primary care physicians and nephrologists and 2 between specialists and nephrologists

In most cases, more than 90% of the nephrologists followed the same policy.

Male nephrologists and nephrologists who were working part-time were more likely to accept patients for dialysis than female nephrologists and nephrologists working full-time. However, this percentage was only significantly different between male and female nephrologists in the 80-year-old psychiatric case ($\chi^2 = 7.40$, $P = 0.007$) and between nephrologists who were working full- and part-time in the 80-year-old cancer case ($\chi^2 = 8.90$, $P = 0.003$). Age, religiosity, years in practice and type of hospital had no significant effect on the decision of nephrologists to accept patients for dialysis.

Differences within groups of primary care physicians and non-nephrology specialists regarding the likelihood to refer patients for dialysis did not depend on background characteristics (data not shown).

Impact of patient's age and comorbidity on referral decision. On the question whether age affects the decision to refer or accept patients for dialysis, 87% of the primary care physicians stated that they would refer regardless of the patient's age. The other 13% physicians indicated that they would no longer refer at a mean age of 83 years (range = 75–95 years, $SD = 4.9$). Ninety-eight percent of the specialists and all nephrologists declared that they would refer regardless of age.

The percentage of primary care physicians and specialists who reported that they would probably or definitely refer decreased significantly for 80-year-old patients in almost all cases in comparison to 65-year-old patients ($P < 0.01$, ORs ranged from 0.01 to 0.11 for primary care physicians and from 0.02 to 0.11 for non-nephrology specialists), whereas this was not found for nephrologists.

The percentage of physicians who would refer patients depended on the type and severity of comorbidity. The likelihood of referral decreased as the severity of the comorbidity increased ($P \leq 0.001$), and these decreases were strongest for patients with cancer and cognitive impairments. An exception was a number of primary care physicians ($n=84$) and specialists ($n=31$) who reported the reverse for patients with shortness of breath, which means that the likelihood of referral increased as the severity of comorbidity increased.

Differences in referral between groups of physicians. The percentage of nephrologists who would probably or definitely accept patients for dialysis was in almost all cases higher than the percentage of primary care physicians and specialists who would refer patients, but differences did not always reach statistical significance (Figure 1). The following is an exception: a 65-year-old patient with more severe psychiatric disorders was more likely to be referred by primary care physicians than to be accepted by nephrologists (significant OR = 0.37, CI = 0.14–0.99).

The differences in referral/acceptance behaviour between groups of physicians were larger for 80-year-old than for 65-year-old patients. The largest differences between physicians were found for patients with a less severe shortness of breath (significant OR ranged from 4.9 to 30.0) and cognitive impairments (significant OR ranged from 6.3 to 7.2), and with more severe diabetes (significant OR ranged from 5.3 to 6.8) and more social impairments (significant OR ranged from 5.9 to 6.7); hardly any differences were found for patients with cancer. The severity of comorbid conditions affected the likelihood of referral. The extent to which severity affects referral differed per comorbidity.

Discussion

The results of this study show that older patients and patients with severe comorbidities are less likely to be referred or accepted for dialysis. However, rather large differences exist by and within groups of physicians.

Differences within groups of physicians. The results suggest that there is no consensus regarding the likelihood of referring patients to nephrologists within groups of primary care physicians and non-nephrology specialists. For example, 40% of the primary care physicians reported that they would probably refer an 80-year-old patient with shortness of breath complaints, whereas the other 60% would probably not refer this patient. Physicians' age, gender, religion, whether they are working full- or part-time, years and type of practice or hospital, population density (only primary care physicians) and specialization (only specialists) did not contribute to these differences in referral. The results were not

supported by the results of the few previous studies that focused on characteristics of physicians. These studies found that younger and less experienced primary care physicians [6] and specialists who are working in the private or regional hospitals [13] were more likely to refer patients than older and more experienced primary care physicians and specialists working in the large centre hospitals.

The male nephrologists in the current study and those who were working part-time were more likely to accept patients for dialysis than other ones. In contrast with the results of an earlier study [9], no differences were found between academic and non-academic nephrologists. Results are based on a small number of nephrologists ($n=20$) and are therefore just tentative.

Furthermore, results demonstrate that patient characteristics affected the referral and acceptance patterns. First, it is noteworthy that results of the vignettes showed that 80-year-old patients were less likely to be referred than 65-year-old patients, especially within the group of primary care physicians and non-nephrology specialists. However, the physicians answered negatively on the direct question whether age would affect their referral decision. An explanation is that physicians have a tendency to give socially acceptable answers when asked directly. It might also be that within vignettes physicians are taking the context (presence of comorbidity) into account. Second, the type and severity of comorbidity were used as criteria by all three groups of physicians. The referral pattern, in general, decreased with increasing levels of severity.

Earlier studies showed that the patient's age was not an important predictor of survival and hospitalization [14–16] and that life is perceived to be satisfactory by elderly dialysis patients [17]. Therefore, age alone should not be used to preclude dialysis. But it is known that patients with severe comorbidities may not always benefit from dialysis [14,15,18]. However, a large number of elderly patients have shortness of breath complaints or cognitive impairments. It is known that these patients can develop a significant improvement in their symptoms when dialysing. The restricted policy in primary care physicians and specialists referring patients in these situations suggests that patients who might benefit from dialysis have not been offered this treatment. This policy might be an important explanation for the relatively low incidence of elderly dialysis patients in the Netherlands in comparison with other countries, particularly Belgium.

Differences between groups of physicians. The study found that a greater percentage of nephrologists indicated that they would accept older patients and patients with comorbidities for dialysis, in particular those with physical comorbidities, than did the other groups of physicians. Although there seemed to be consensus that dialysis is not appropriate for patients under some circumstances (for example terminal cancer), a noteworthy variation existed among the three groups of physicians regarding patients with

other comorbidities, such as mild shortness of breath, diabetes and mild cognitive impairments.

Knowledge on the appropriateness of dialysis treatment for elderly and less healthy patients is still in its infancy, and there are in the Netherlands no clear guidelines for referral of this group of patients. Therefore, it is difficult to assess whether primary care physicians and non-nephrology specialists are too conservative in their referral patterns or that nephrologists are accepting patients who are too sick to benefit from dialysis. However, we do know from previous studies that there might be a lack of knowledge about ESRD and also about the indication and prognosis of dialysis in the group of primary care physicians and non-nephrology specialists [4,10]. A previous study also suggested that the nephrologists treat patients with chronic kidney disease more appropriately than non-nephrologists [19]. It may also be that non-nephrologists have (too much) confidence in their capacity to manage kidney disease by themselves and underestimate the additional value of nephrologists' consultation [7].

Strengths and limitations

This study is one of the few to examine the referral of elderly patients with ESRD by various types of physicians within a clearly defined geographic area. In accordance with previous research among physicians [6], a low response rate was obtained in the current study. Most characteristics of physicians who participated did not differ from those who declined participation. We cannot exclude that a sample bias exists, though physicians who declined participation may have had less involvement with or less knowledge on kidney diseases. An underestimation of the differences between physicians may have been the consequence.

A vignette methodology was chosen because it offers the opportunity to confront all physicians with the same patient under the same conditions. A limitation of this methodology is that opinions, rather than the actual behaviour, of physicians are measured. Responses thus may have been influenced by social desirability factors. Previous studies however found that the statements of physicians regarding the initiation of dialysis reflect actual practice [20,21], which supports its validity regarding actual behaviour.

Implications

National guidelines should be developed and implemented by nephrologists in various countries as soon as possible to increase the quality of care for elderly kidney patients. Education programmes should be developed to improve the knowledge of primary care physicians and non-nephrology specialists on the identification and management of chronic kidney disease. Specifically, attention should be paid to the possibilities of dialysis for elderly patients. Physicians should be stimulated to use the estimated glomerular

filtration rate (eGFR) to assess kidney function. Within this scope, it is preferable to encourage laboratories to automatically report eGFR when serum creatinine is measured. Moreover, physicians must be made aware of the added value of nephrologists to this patient group. Nephrologists can treat chronic kidney disease adequately by preventing or slowing the progress, and reverse the development of complications even before turning to dialysis. This may highly improve the life expectancy and quality of life of elderly patients with ESRD. They can also, in collaboration with the multidisciplinary pre-dialysis team, adequately inform the patient regarding dialysis and its potential risks and benefits.

Furthermore, research is required to understand the differences in incidence between countries. More research is also needed into the circumstances under which an elderly patient with comorbidities might benefit from dialysis. With this information nephrologists are better able to offer dialysis to patients who might benefit from it.

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Conflict of interest statement. None declared.

References

1. Jager KJ, van Dijk PCW, Dekker FW, Stengel B, Simpson K, Briggs JD. The epidemic of aging in renal replacement therapy: an update on elderly patients and their outcomes. *Clin Nephrol* 2003; 60: 352–360
2. Ronsberg F, Isles C, Simpson K, Prescott G. Renal replacement therapy in the over-80s. *Age Ageing* 2005; 34: 148–152
3. Rebollo P, Ortega F, Baltar J, Alvarez-Ude F, Navascues R, Alvarez-Grande J. Is the loss of health-related quality of life during renal replacement therapy lower in elderly patients than in younger patients? *Nephrol Dial Transplant* 2001; 16: 1675–1680
4. Mendelssohn DC, Kua BT, Singer PA. Referral for dialysis in Ontario. *Arch Intern Med* 1995; 155: 2473–2478
5. Parry RG, Crowe A, Stevens JM, Mason JC, Roderick P. Referral of elderly patients with severe renal failure: questionnaire survey of physicians. *Brit Med J* 1996; 313: 466
6. Wilson R, Godwin M, Seguin R *et al.* End-stage renal disease: factors affecting referral decisions by family physicians in Canada, The United States and Britain. *Am J Kidney Dis* 2001; 38: 42–48
7. Winkelmayer C. Determinants of delayed nephrologist referral in patients with chronic kidney disease. *Am J Kidney Dis* 2001; 38: 1178–1184
8. Clement R, Chevalet P, Rodat O, Ould-Aoudia V, Berger M. Withholding or withdrawing dialysis in the elderly: the perspective of a western region of France. *Nephrol Dial Transplant* 2005; 20: 2446–2452
9. Sekkari M, Moss A. Withholding and withdrawing dialysis: the role of physician specialty and education and patient functional status. *Am J Kidney Dis* 1998; 31: 464–472
10. Nissenson AR, Prichard SS, Cheng IKP *et al.* Non-medical factors that impact on ESRD modality selection. *Kidney Int* 1993; 43: S120–S127
11. Stengel B, Billon S, Van Dijk PCW *et al.* Trends in the incidence of renal replacement therapy for end-stage renal disease

- in Europe, 1990-1999. *Nephrol Dial Transplant* 2003; 18: 1824-1833
12. Wauters J, Bosson J, Forneris G *et al.* Patient referral is influenced by dialysis centre structure in the Diamant Alpin Dialysis cohort study. *Nephrol Dial Transplant* 2004; 19: 2341-2346
 13. Chandna S, Schulz J, Lawrence C, Greenwood R, Farrington K. Is there a rationale for rationing chronic dialysis? A hospital based cohort study of factors affecting survival and morbidity. *Brit Med J* 1999; 318: 217-223
 14. Lamping DL, Constantinovici N, Roderick P *et al.* Clinical outcomes, quality of life, and costs in the North Thames Dialysis Study of elderly people on dialysis: a prospective cohort study. *The Lancet* 2000; 356: 1543-1550
 15. Peri U, Fenves A, Middleton J. Improving survival of octogenarian patients selected for haemodialysis. *Nephrol Dial Transplant* 2001; 16: 2201-2206
 16. Latos DL. Chronic dialysis in patients over age 65. *J Am Soc Nephrol* 1996; 7: 637-646
 17. Smith C, Silva-Gane M, Chandna S, Warwicker P, Greenwood R, Farrington K. Choosing not to dialyse: evaluation of planned non-dialytic management in a cohort of patients with end-stage renal failure. *Nephron Clin Pract* 2003; 95: c40-c46
 18. Patwardhan MB, Samsa GP, Matchar DB, Haley WE. Advanced chronic kidney disease practice patterns among nephrologists and non-nephrologists: a database analysis. *Clin J Am Soc Nephrol* 2007; 2: 277-283
 19. Peabody J, Luck J, Glassman P, Dresselhaus T, Lee M. Comparison of vignettes, standardized patients, and chart abstraction: a prospective validation study of 3 methods for measuring quality. *JAMA* 2000; 283: 1715-1722
 20. Lambie M, Rayner H, Bragg-Gresham J *et al.* Starting and withdrawing haemodialysis-associations between nephrologists' opinions, patient characteristics and practice patterns (data from the Dialysis Outcomes and Practice Patterns Study). *Nephrol Dial Transplant* 2006; 21: 2814-2820

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